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1823

HITCHCOCK
UTILITY OF NATURAL
HISTORY



Utility of Natural History.



A

DISCOURSE,

DELIVERED BEFORE THE

BERKSHIRE MEDICAL INSTITUTION,

AT THE ORGANIZATION OF THE

Lyceum of Natural History,

IN PITTSFIELD,

SEPT. 10, 1823.



BY REV. EDWARD HITCHCOCK,

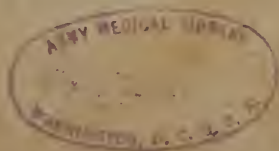
PASTOR OF THE CHURCH IN CONWAY.



PITTSFIELD :

PRINTED BY PHINEHAS ALLEN.

OCTOBER, 1823.



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*Berkshire Medical Institution,
Sept. 10th, 1823.*

REV. EDWARD HITCHCOCK.

DEAR SIR,

BY a unanimous vote of the members of the Lyceum, we are deputed to present you their sincere thanks for the ingenious and learned Discourse, delivered at the organization of the Society, and to solicit a copy for publication. Permit us to express the personal gratification, which we shall feel, in your compliance with the wishes of all who were present.

With sentiments of high esteem,

Your obedient servants,

H. H. CHILDS,
ORIN WRIGHT.

Conway, 20th Sept. 1823.

GENTLEMEN,

IN complying with your request, in your Note of the 10th instant, I have only to regret that my Discourse is not more worthy of publication, and of the liberal commendation you bestow upon it ; and to beg you to accept my sincere wish for the prosperity and usefulness of the Lyceum, and the Medical Institution with which it is connected, and of the assurance of my respect and high consideration.

EDWARD HITCHCOCK.

DOCTRS. H. H. CHILDS, }
O. WRIGHT, } *Committee of the Lyceum.*

A Discourse.



1 KINGS, iv. 33.

And he spake of trees, from the cedar tree that is in Lebanon, even unto the hyssop that springeth out of the wall : he spake also of beasts, and of fowl, and of creeping things, and of fishes.

TO select a text, as the theme of discourse on this occasion, from the holy scriptures, may, at first thought, seem less proper, than to have chosen an appropriate motto from the writings of some eminent modern naturalist. It is not, indeed, to be supposed that Solomon, concerning whom the text was written, or any other mere man whose history is given in the bible, possessed that accurate and extensive knowledge of the natural sciences which has been attained in these latter days. His acquaintance with the vegetable and animal kingdoms was, probably, of a practical character chiefly ; and was, no doubt, destitute of the precision, method and minuteness of modern science : For there is no reason for supposing any thing supernatural in his knowledge of these subjects. The text means only, that he was acquainted with all that was then known concerning them. Yet on this supposition, we feel as if the example of Solomon, in this respect, were more to be regarded than that of any modern naturalist, however distinguished. For inspiration has pronounced him the wisest of men : and if a part of that wisdom consisted in a knowledge of natural history, it furnishes a presumptive evidence of the value of the pursuit. A man of eminent knowledge might be pronounced wise by his fellow men, while in the view of heaven his wisdom might be folly ; since many things *highly esteemed among men are abomination in the sight of God.* But when

Jehovah pronounces any particular attainments to be wisdom, we no longer hesitate to regard them as such. It is always pleasant, therefore, to be able to appeal to the word of God as our authority ; and a *thus saith the Lord* is vastly more satisfactory than the uninspired declaration of any man, however eminent.

That Solomon's knowledge of natural history was of a highly practical character, or that he was chiefly conversant with those objects that are useful, rather than with those that are merely curious, is probable from the nature of the case. For in the incipient stages of the natural sciences, immediate utility is almost the only motive to exertion. It is reserved for a more advanced state of knowledge, to devote time and talents to those branches of a pursuit, whose benefit is merely possible and very remote. So long as the field of science is filled with conspicuous and beautiful flowers, it cannot be expected the collector will pass them by, for those that are obscure and unsightly. But it may in this place with propriety be enquired, what fact in natural history, even in its present advanced state, could be uninteresting, or useless, to such a mind and such a heart as Solomon and David and Job possessed ? In the writings of all these patriarchs, we have abundant evidence that they were diligent observers and ardent admirers of the works of nature, both in the heavens above and the earth beneath. *Ask now the beasts, says Job, and they shall teach thee ; and the fowls of the air, and they shall tell thee : or speak to the earth, and it shall teach thee ; and the fishes of the sea shall declare unto thee. The heavens, says David, declare thy glory, and the firmament sheweth thine handy work. O Lord, how manifold are thy works ! In wisdom hast thou made them all ; the earth is full of thy riches. So is this great and wide sea, wherein are things creeping innumerable, both small and great beasts. I meditate on all thy works, I muse on the work of thy hands.* These holy men applied their knowledge of creation, not only to promote their temporal comfort, but also for their moral and religious improvement. In every ob-

The Lyceum have the pleasure of acknowledging the re-
tion of several boxes of Minerals, Shells, Indian Imple-
s, and Animals, from different parts of the country. A
ctable Cabinet of Minerals is already collected. The
mens in Natural History are arranged in a room, ap-
iated to the purpose, in the Medical Institution. Con-
ible additions are expected from the Class of near eigh-
dical Students now attending the course of Medical
res. The Lyceum respectfully solicit the aid of gen-
in increasing their Cabinet of Curiosities.

field, Oct. 18, 1823.

the enjoyments and employments of heaven: For it is the
song of Moses and the Lamb on mount Zion above, great
and marvellous are thy works, Lord God Almighty. And if
we love the character as well as the works of God on earth,
ours will be the privilege and the glory of tuning our golden
harps to this elevated song. O where is the natural
sunk below the dignity of his nature, so dead to the
ine influence of his pursuits, as not to feel kindling
him a holy and ardent anticipation of that blessed state
his world notwithstanding all that science and re-
ligion have done, we see through a glass darkly

ject they loved to trace the wisdom and the goodness of God, and with filial confidence to say, "my Father made them all." From every field of nature that opened before them they inhaled a holy fragrance, and found fresh fuel to feed the flame of devotion on the altar of their hearts. Hence, every new accession to their knowledge served to humble and not to puff them up with the pride of science. For they did not stop to compare their superior attainments with the ignorance of others ; but found ample employment in comparing their ignorance with the wisdom of God. And to men who thus applied natural history, we again ask, what fact in that science could be uninteresting or useless ? Whether with the eye of a zoologist, they examined the mechanism and habits of the most perfect quadruped, or of the scarcely animated zoophyte ; or whether with the eye of a botanist, they gazed on the brilliant ornament of the flower garden, or observed the obscure lichen and moss of the retired precipice ; they met with mementos, ever fresh and varied, though essentially the same, of the perfections of God, and felt their love to his character kindling at every step. And this moral influence of natural history is, in fact, the most important of its benefits : and, therefore, we appeal with confidence and pleasure to the example of Solomon and Job and David, while we attempt to exhibit the most interesting relations of this science to the temporal and eternal interests of man. We rejoice to be able to cite their authority as naturalists of a genuine stamp ; while, at the same time, we can add, that they were men of eminent piety. What was cultivated by men of such general purity of moral feeling, must, unless perverted, have a salutary tendency. What exerted a healthful influence upon them, is calculated to benefit others.

In pursuing this subject, I propose to consider,

First : the Utility of Natural History in relation to the common and social interests of man.

Secondly : its Utility in relation to intellectual improvement.

And Thirdly : its Utility in relation to religion.

The science of natural history comprehends a description of every material substance, organized and unorganized, animate and inanimate, that exists naturally within, and upon, this globe ; including the atmosphere. In other words, it embraces every earthly, material object, that is not artificial. But in order that we may have the subject more particularly brought to recollection on this occasion, I shall just advert to the grand classes of beings and things, that come within the cognizance of this science. The whole forms one connected and beautiful chain, the several parts of which, although varying widely in some respects, yet retain a distinct identity.

At the head of this series is man ; whose natural history, appropriately so called, is not extensive ; because he constitutes but a single species ; and it is with man as an animal only, that this science is concerned. Yet the varieties of our species, whether we contemplate the beautiful lineaments and graceful form of the Caucasian* ; or the broad olive countenance and diminished stature of the Mongolian ; or the dark, wooly, and sun burnt Ethiopian ; or the untamed red man of our own forests ; or the Malay, with his dark hair and brown features ; all these varieties furnish much interesting matter for the examination of the naturalist ; especially as that investigation has a bearing upon the highest interests of the race.

The second link in the descending series of animated beings is the quadrupeds ; of which, the species amount to not less than 600.† The third link is the feathered tribes ; of which, 3000 species have been described. The fourth link

* It will be perceived, that in these allusions, the division of Blumenback has been adopted.

† The numbers given under the several classes, were chiefly obtained by consulting Rees' Cyclopaedia, Clinton's Discourse before the New-York Lit. and Phil. Soc. North American Review, and Cleveland's Mineralogy. It is obvious that the estimate, in most instances, must be far below the truth.

embraces the amphibia, or reptiles and serpents ; 400 species of which are known to exist. The fifth link comprehends the fishes ; including not less than 1000 species. The sixth link is composed of the insect tribe ; 20,000 species of which have been discovered. The seventh link embraces those animated and semianimated beings, known by the general name of vermes ; such as the various kinds of shell animals, corals, sponges, polypi, and microscopic animalcules that float in air and water ; extending, in the whole, to about 4000 species. The eighth link introduces us into the vegetable kingdom ; and not less than 44,000 species of plants have already been described ; which, in the opinion of the most able botanists, is probably less than half the real number that actually exists on the globe. The last link carries us beyond the region of organized being, and places us in the mineral kingdom ; comprehending the great mass of the globe. It furnishes, however, less than 300 species.

All will acknowledge that the field opened to the naturalist is vast, and the objects before him almost endlessly varied. But the *cui bono*, the utility of these pursuits, may not be so obvious. And to this point I invite your attention. I begin with exhibiting the utility of natural history in relation to the common and social interests of man.

There is no stronger desire of human nature, and, indeed, of all animal natures, than that of self preservation. And constant experience testifies to the truth of the scriptural declaration, *skin for skin, yea, all that a man hath, will he give for his life*. And it is a demonstrative proof that man lives in a state partly penal and partly merciful,* that while pain and death are commissioned to ravage the world and to convert it into a vast Golgotha, so many remedies to alleviate distress, to heal diseases, and to stay the uplifted arm of the king of terrors, are placed within the reach of human sagacity. The box of Pandora has, indeed, let loose a deluge of miseries upon our fallen race : But we are not left

* See Gisborne's Testimony of Nat. Theology to Christianity.

so destitute as the poets would have us believe. Something more than hope remains. Hope, however ardent, cannot resist the power of disease, nor delay the stroke of death. But medicine is permitted, in thousands of instances, to achieve such victories. And the weapons with which she has performed and continues to perform these important services for mankind, are entirely derived from the vast storehouse of natural history. From the three great kingdoms of nature, the mineral, the vegetable, and the animal, the *materia medica* is supplied. Before natural history was cultivated as a science, the remedies employed were very limited and imperfect; while many a fanciful and superstitious virtue was attributed to them. But when ingenious men began to invent methods of distinguishing different substances from one another, and of ascertaining their true nature, the superfluous mummerly attached to the subject, gradually disappeared; those remedies, whose efficacy was merely imaginary, were rejected; and others, of real value, brought to light. Every subsequent improvement in natural history, or its kindred sciences, was accompanied by a correspondent improvement in the *Pandects of Medicine*. Especially, when the light of the new Chemistry was shed on the world, its beams fell powerfully upon the fields of natural Science, disclosing a thousand new objects; and they were reflected, with a healing and purifying power, upon the science of medicine. But improvements in the remedies for disease, have not yet reached their limits. The annals of medicine, indeed, testify, that new ones are yearly brought to light. And who does not perceive the field of discovery to be wide and fertile? Especially does it promise a rich harvest in this country, where the virtues of so few natural native products have been unfolded. The hope of discovering a *Panacea*, has, indeed, long since been abandoned by all men of real science, along with the quadrature of the circle and perpetual motion; nor can we expect, with the physicians of the fifteenth century, that improvements in medicine will restore antediluvian longevity to our race. Inspiration has declar-

ed the days of our years to be three-score years and ten ; and that death must pass upon all, because all have sinned. Yet God always has added a blessing to the efforts that have been made to improve the science of medicine, and thus to prevent premature death, to mitigate pain, and to rescue the victim from the grasp of many an unrelenting disease. And, as already observed, there is every reason to believe, that in the extensive kingdom of nature, thousands of remedies lie concealed to reward the researches of the scientific physician and to cause the hearts of unborn millions to sing for joy.

Does any one reply to all this, by saying that a medical man may become acquainted with the remedies natural history develops, without becoming an adept in the science ? So might the preacher of the Gospel perform the duties of his office to general acceptance, who is unacquainted with the original languages in which the scriptures were written : and no doubt there have been many such of great usefulness, as there have been probably many physicians of respectable skill, who were ignorant of natural history. But such a divine subjects himself to the charge of receiving his doctrines second-handed, and of depending, in fact, upon fallible men, for what he presents as the infallible oracles of God : and a similar remark will apply to such a physician. Such a divine may be useful without a knowledge of Hebrew and Greek ; but he would be more useful with it : and such a physician may be skilful without an acquaintance with natural history ; but he would be more skilful with it. A man might perform almost every process in mathematics, who understood not the demonstration of a single theorem : but, he could hardly be called an eminent mathematician, so long as he was a mere blind follower of others. And we do not see how a man, unacquainted with natural history, could employ a single remedy that was not actually collected for him by others. For however numerous the medicinal plants and minerals around him, if unable to discriminate one species from another, they would be wholly useless. In such

cases, accuracy is of the first importance ; and it is dangerous to trust to that general resemblance between different specimens, which strikes every eye, but which may consist with a diversity of properties, and not only specific, but even generic character.* The difference between two species, indeed, is often so slight as to perplex the most experienced eye ; although the one may be salutary, and the other deadly poison. And there is reason to fear, that were the dead permitted to speak, many an untimely victim of the grave, might execrate the ignorance which could not distinguish the bane from the antidote.

I can hardly avoid remarking in this connection, that what has been said of the importance of a knowledge of natural history to the physician, applies with still greater force to the science of chemistry. For it will hardly be doubted, as a distinguished writer has observed, “ that modern chemistry has done more in twenty years for medicine, than all the united labors of preceding ages.” Indeed, without a knowledge of it, must not the physician be entirely ignorant of the nature of the remedies he administers ? a deficiency so great and glaring, few at this day will not blush to acknowledge it.

But this is digression. Perhaps too an apology is due for the introduction of so much in this place that relates almost exclusively to the medical profession ; coming, as it does, from one who makes no pretensions to a knowledge of that profession in any of its details. But less than this could hardly have been said, if any justice were done to the first head of this discourse : And so long as the speaker confined himself to general principles, to those that form a part of the *commune vinculum* of the sciences, he thought he should

* *Ex. gr.* Myrrhis claytoni Mx. and Chaerophyllum procumbens L. or Pastinaca sativa L. and Heracleum L. lanatum Mx. or Angelica L. triquinata Mx. and A. atropurpurea L. ? or Cetraria islandica Ach. and several species of Peltidea : or the eatable and poisonous species of Agaricus. Who, that understands these references, does not see how extremely dangerous it is to trust to the prescriptions of an ignorant *root doctor* !

not be accused, on such an occasion, and before such an audience as this, of arrogance ; or of *darkening counsel by words without knowledge*.

There is another respect, besides furnishing the physician with remedies, in which the cultivation of natural history may conduce to the preservation and recovery of the health. We live in a day when there is a wide spreading complaint, especially among literary men, of debilitated constitutions and premature decay. Those Protean maladies, known by the name of nervous diseases, although scarcely in existence two centuries ago, now constitute, according to a respectable writer,* two thirds of the complaints of civilized society : and they exert an alarming and paralyzing influence, not only upon the comfort of individuals, but also upon the interests of learning. The literati of these days look with amazement upon the ponderous folios of other centuries, and sigh over the degeneracy of their constitutions.† Now it is well known, that in most instances these baneful disorders are induced and fostered by the neglect of proper and vigorous exercise. And if this is well known, why do not those of sedentary habits, while in health, improve by the dear bought experience of others, and not suffer their constitutions to fall a prey to inaction ? In most cases the reason undoubtedly is, that no sufficiently powerful motive is presented to them to adopt an energetic and systematic plan of exercise. Their studies, or their soft couches, present vastly stronger attractions, than the untrodden glen, or the rough mountain. But were they to acquire a taste for natural history, this motive to exercise would be supplied. Their

* Trotter on the Nervous Temperament.

† We know not whether astonishment or incredulity predominates in the mind of the modern dyspeptic, (and who that follows the fashions of the literary world is not a dyspeptic !) when he reads in his Bibliotheca, that Calvin wrote 120 works ; Luther nearly as many ; Baxter 145 ; Cole and Ryman 50 folios each ; Prynne 200 treatises, and Origen 6000 ! At least, we fancy we hear him exclaiming, *credo, quia impossibile est* : or in the words of Horace, with a slight variation, *O dura priorum ilia* !

morning and evening walks would not be terminated by the limits of the smooth shaven green : nor would they, as the majority of literary men now do, carry abroad with them their studies or their cares, and thus counteract the benefits of their exercise, and have but little interest excited within them by the richness, variety, and beauty of creation : But every newly opening flower ; every passing, or glittering insect ; and every rock along their course, would excite a lively interest ; banish care and laborious study ; allure them with quickened steps into the pathless valley ; along the margin of the stream, or the lake ; through the deep and solitary forest, and up the steep and rocky mountain : And many a time would they hail the beams of the rising sun from the top of the lofty precipice ; survey with keen relish the landscape below ; listen to the mingled sounds of industry and nature ; drink in the sweet and invigorating breeze of the morning, and thus prepare themselves to engage, at the proper season, with renewed vigor, in professional studies or duties. Such a course might not, indeed, in every case eradicate or prevent disease ; but such would certainly be its salutary tendency.

The objects that present themselves to the researches of the naturalist are so numerous and varied, that he is fed almost continually with novelty ; and thus a deep and lively interest is excited in his pursuits. Now could a taste for such studies be infused into the leading members of society, especially among the young, would it not lead to a more diligent improvement of time ; and tend to banish from conversation, much that is frivolous, and much that is criminal ! How much better would it be for morality and the peace of society, if much of the breath that is now devoted to retail the slanderous report, to excite local prejudices, and to dissipate the mind, should be spent in discussing and unfolding the beauties and glories of the Creator's works ! How much better, if that time, which is now worse than wasted in sighing and weeping over the false pictures of romance, could be consecrated to scanning the realities of nature ! And the

records of science testify, that where once a taste for natural history has been imbibed, there is a charm in the study of it, strong enough to subdue the love of frivolity, slander and fiction.

Natural history tends, likewise, to increase, in its votaries, a love of country. The fields over which we have wandered, the valleys we have explored, and the mountains we have climbed, will always be dearer to us than any other fields, any other vallies, or any other mountains. It is truly astonishing, how vividly the recollection of a particular mineral or plant is associated, in the mind of the mineralogist or botanist, with the scenery of the spot where they were first collected by him. There is a bewitching charm, too, in that spot, that causes him, ever afterwards, to look back upon it with a sort of affection.

Were there time on this occasion, I might exhibit the numerous accessions that are often made to a nations wealth, strength and glory, through the agency of natural history. It is her province to explore and bring to light the internal resources of a country ; and then chemistry, her handmaid, stands ready to convert them into materials of public utility. For illustration of this remark, I might appeal to the coal, lead, tin, chalk, and other mines of England ; to the iron mines of Sweden and Russia ; to the German and Spanish mines of mercury ; to the salt mines of Spain, Poland, Hungary and England ; to the precious mines of Mexico and South America ; or to the lead, coal, and gypsum of the United States.

Many of the important arts of life, especially agriculture, have an intimate connection with natural history : But upon this fertile subject time will not permit me to enlarge.

And finally, the pursuit of natural history furnishes, to say the least, much innocent recreation and pleasure. Relaxation from their duties and studies, is required by all who are active and faithful : and it is an important point gained, when the nature of our amusements is such, that while the body is invigorated, the mind and the heart shall not be

corrupted. In most of these recreations that are purely artificial, there lurks some secret poison ; and where they bring us in contact with society, the ingenuous mind and pure heart are apt to be pained, and to lose a part of the benefit and the pleasure, by the exhibition, in some shape or other, of human depravity. But when nature is explored, merely as a source of pleasure, and not from a restless desire of distinction, we enter a field entirely abstracted from human passions and contests, and seem to breathe an atmosphere of innocence and peace. There may be earthly pleasures more extatick, but none are more calm and unadulterated, than the naturalist feels, when bursting away from a busy world, he roves through the dark imbowering woods ; traces the murmuring stream through the solitary glen, or over the rocky precipice ; and mounts the “ cloud capt” mountain. With ardent curiosity he scans the varied flowers ; seizes the curious mineral ; observes the brilliant insect tribes, and listens to the tuneful birds. How the scene soothes every tumultuous and anxious feeling in his bosom ! harmonizes every power of his soul ! and if he be a Christian, awakens a deep felt adoration and love of that God, whose glory and wisdom and goodness seem to breathe, like holy incense, from every object around him. Then is he able to rise and share in the inspiration of the poet :

“ O Nature, how in every charm supreme !

“ Whose votaries feast on raptures ever new !

“ O for the voice and fire of seraphim,

“ To sing thy glories with devotion due !”

Secondly. I proceed to consider the utility of Natural History in relation to intellectual improvement.

And I trust I shall speak the sentiments of every enlightened man, when I say, that this pursuit is well fitted to improve and refine the taste. It is not necessary, in order to prove this, to discuss, or decide those difficult questions that have been long agitated, concerning the nature and foundation of taste. For all acknowledge it to be a faculty progressive and improvable ; and that nature, or the works of God, are the best of all models and the final standard, so far

as they can be employed. And it is with nature—with unadulterated nature—that natural history is conversant. Individual instances, indeed, occur in the kingdom of nature, of distortion and disproportion. But these are easily distinguished and not liable to pervert the taste. In general, the workmanship of nature is perfect—perfect in form, and attitude, and aspect—perfect in her separations and in her groupings—perfect in her proportions, and perfect in her symmetry. This cannot be said of the most finished human production. The most the artist can do, is to approximate to nature ; and the more thoroughly he has studied the models the works of creation present, the more chastened will be his taste, and the nearer to perfection will he attain.

We can conceive, too, how the literary taste may be improved in the same way. An examination of the works of nature, shows her in every thing, to be either sublimely or beautifully simple. Hence the student will learn to relish such simplicity in literature ; and to reject what is gaudy and meretricious. A boundless field, also, is opened in the mineral, vegetable and animal kingdoms, rich with fine illustrations and figures. If it be objected to such, that they would be obscure to most readers ; certainly this objection lies with equal weight against those derived from pagan mythology, of which the literature of the last century is full.

If there be, then, so much in the works of God around us, to improve and gratify the taste ; I pause here to ask, why it is, that so few take an interest in their beauties ? There is no one, whose gaze will not be forcibly attracted by the appearance of a splendid mansion, or equipage, or any pageant of art. But let him turn his eye from these, to the expanse of heaven ; or let him examine the minutest flower under his feet ; or the obscure moss and lichen ; or even the mushroom of a night, and what seemed magnificent in the works of art, now becomes diminutive : what seemed symmetrical, appears disproportionate : what seemed beautiful, becomes deformed. I would not depreciate the works of art : I ask only, why it is, that the few works of man,

confessedly imperfect and inferior, should engross so much attention, while the ten thousand exquisite beauties God has scattered in such profusion along our every day paths, should excite scarcely no interest, and be trodden under foot unheeded. We deprecate the stupid barbarity of the Turk and the Arab, who can stand amid the ruins of Athens and Palmyra, and have not one spark of curiosity excited within them to know the origin and the authors of the broken walls and columns strewed around them : and instead of admiring the beauty of the workmanship, can deliberately mutilate the rich cornices, friezes and pedestals, for the sake of an insignificant pecuniary profit. But let us hold our peace concerning the Turk and the Arab, if we can live uninterested year after year, in the midst of the glorious temple of nature in which Jehovah has placed us, where we behold, not mere fragments, but every part of the edifice, formed by an Almighty and all Wise Architect, standing forth in unclouded perfection, beauty and grandeur, and fitted to awaken the most ardent curiosity and deepest admiration of an incorrupted taste.

“ O how canst thou renounce the boundless store
 “ Of charms which Nature to her votary yields !
 “ The warbling woodland, the resounding shore,
 “ The pomp of groves, and garniture of fields ;
 “ All that the genial ray of morning gilds,
 “ And all that echoes to the song of even ;
 “ All that the mountains sheltering bosom shields,
 “ And all the dread magnificence of heaven ;
 “ O, how canst thou renounce, and hope to be forgiven !”

If there be any truth in these remarks, we need not wonder that we often witness in the naturalist, an attachment to his favorite science, more enthusiastic and devoted, than in any other pursuit. If the painter and the sculptor immerse themselves for months and years in the academies, galleries and churches of Rome, Florence, Paris and London, to study and admire and catch the spirit of ancient masters in their favorite arts, need it be thought incredible, that those, who have been taught to relish the more perfect and varied

models the great temple of nature presents, should abandon for a time the abodes of civilized society and penetrate the remotest and most inhospitable climes in search of new beauties? Ought it to surprise us, to trace a Humboldt through the forests and over the mountains of Mexico and South America; or a Saussure amid the threatening glaciers of the Alps; or a Van Buck over the bleak regions of Norway and Lapland; or a Smith,* now scaling the lava of Teneriffe, and now following Adanson into the barbarous regions of Africa; or a Brown, plunging into the forests of New-Holland, and amid the rich and novel assemblage of natural beauties around him, heedless of the hissing serpent and the prowling hyæna? The hope of acquiring fame may, indeed, be a powerful spur in such cases to the naturalist, as well as to the artist; but it is difficult to account for all his devotedness, without supposing within him a strong relish for the beauties of nature, independent of all selfish feelings.

Concerning the relation of natural history to the reasoning powers, a few words will suffice. In order to exalt the value of natural history, I would not attempt to depreciate the utility of other departments of knowledge. I would by no means represent the study of the natural sciences as calculated to strengthen the reasoning powers, equally with the abstruser subjects of moral philosophy, metaphysics, mathematics, or theology. Let it be granted, that these latter branches ought to constitute the bone and sinew of a system of education. I only ask that natural history may come in to clothe this skeleton with the flesh; and then, let the *belles lettres* smooth the inequalities and give the polish, and the work is finished. Natural History is chiefly concerned with facts; and these, we know, form the groundwork on which reason must erect her edifice: and the cause why so many beautiful castles of her creation have crumbled to dust is, that they have wanted this foundation and been built upon the sand.

* Professor Chetien Smith. See Tuckey's Narrative.

Let it not, however, be thought that the study of natural history demands no very vigorous exercise of the faculties. A partial knowledge of this subject may, indeed, be obtained by the mere dint of memory. But that sagacity which can seize upon, fix, and body forth in language, the essential character of a genus or species, belongs to no contemptible rank in the scale of intellect. In botany, for instance, there are not less than 44000 species, each of which must be distinguished from all others; and to do this briefly and neatly, is not an achievement within the power of ignorance or dullness. And especially does it demand comprehensive views and strong powers of ratiocination and combination, to be able, from a confused mass of facts, to invent a system that shall embrace and reduce to order all that is known and all that will be discovered in the science. Indeed, we cannot but believe, that had the intellectual powers of such men as Linnaeus, Tournefort, Jussieu, Cronstadt, Werner, Haüy and Cuvier, been turned into the channel of mathematics, they would have run parallel with those of Newton, Leibnitz, Euler, and La Place; or in the philosophy of mind, with Locke, Reid, Hume, Stewart and Brown; or in moral philosophy, with Paley; or in theology, with Calvin, Edwards and Dwight.

Thirdly : I proceed to consider the utility of natural history in relation to religion.

I have already alluded to the favourable influence of these studies upon the devotional feelings. They unfold to the Christian, a minute and thorough knowledge of the works of his heavenly Father, and disclose ten thousand new and unthought of beauties and glories. And he can scarcely avoid inhaling a portion of that warm and holy incense, which forever rises towards heaven from the altar of nature; nor refuse to join in that ceaseless song, which is chanted by creation in full concert, without a discordant note, to the praise of Jehovah. Whenever David, or Job, or Solomon, looked upon the works of God around them, a holy glow of feeling came over their souls, along with a sense of their com-

parative insignificance : and the goodness of God, which shone so bright in creation, gave new energy to their faith and inspired a firmer confidence in his mercy. The many ardent exclamations concerning the works of God, in the book of Psalms, testify how great was their impression upon the feelings of David. And if a man really love God with the love of complacency, how can he be indifferent to those displays of his attributes—I might say, to that transcript of his character—which creation presents ? Permit me here to enquire, whether many of the customs and refinements of modern society do not tend very much to divert the attention of Christians from those contemplations upon the material world, that served so frequently to enkindle and invigorate the piety of holy men of old ?

But we are not saying in this connection, that devotional feelings are an infallible concomitant of zeal in natural history. Experience, alas, testifies, that a man may be induced by the hope of distinction in these pursuits, or by the mere love of novelty, to traverse the whole globe and to spend his whole life among the works of God that are sublimely great or elegantly little, and yet his icy heart never feel one thrill of devotion, nor any sense of the Divine Presence or Goodness, nor lift one filial prayer to heaven, nor join the creation in a single ascription of praise to Jehovah. But such are Uzziaks in the temple of nature—unconsecrated priests—intruders into the sanctuary, to whom it pertains not to burn incense, and to whom there cleaves a moral leprosy : And such instances do not evince that the study of nature's works tends to foster scepticism and pride. They show rather the strength of prejudice, the power of selfishness, and the obduracy of the human heart.

It may however be supposed, that a scientific and particular acquaintance with the minute parts of creation is not requisite for promoting devotional exercises. It is impossible, indeed, to take a general survey of nature, and not be struck with obvious marks of divine wisdom, power and goodness. But it is the examination of the Creators works

one by one, as to their mechanism, relation and object, it is this that makes the deepest and most abiding impression on the memory and the heart. The man whose eye takes in at once the heavens and the earth has a confused and indefinite sense of magnificence, variety and beauty : But he who examines the physiology of an individual animal, or plant, is astonished and delighted at the marks of contrivance, design and benevolence he discovers.

The utility of natural history in demonstrating the existence and attributes of God is rendered sufficiently obvious by appealing to the works of Paley and Gisborne. And the naturalist knows, that many more striking facts than these writers have exhibited, might be drawn from the rich volume of nature.

Natural history has been applied with considerable success to the elucidation of several passages in the holy scriptures. Many animals, plants and minerals are mentioned in the bible, and many allusions are made to natural objects. These it is the business of natural history to identify and describe ; and thus to give force and beauty to many texts, which would otherwise be obscure or unintelligible. To the man acquainted with zoology, ornithology and conchology, for instance, how much more vivid and striking appear the 39th Chapter of Job, and the 104th Psalm : or to the botanist, the frequent allusions to the trees and flowers of Judea : or to the mineralogist, the description of the breast plate and ephod of the Jewish high priest, and of the twelve foundations of the New-Jerusalem. But on this subject I cannot enlarge.* I proceed to notice some other subjects in revealed religion, to the explanation of which the studies we are contemplating have lent more important aid.

The diversities found among the different tribes of men on earth, in their stature, form and complexion, have long

* On this subject see Harris' Natural History of the Bible ; and also a pamphlet by Sir J. E. Smith, entitled, Considerations respecting Cambridge, more particularly relating to its Botanical Professorship.

been urged as conclusive evidence of a variety of progenitors ; contrary to the representations of scripture, which affirms all men to have descended from one original stock. Here then was a problem for naturalists. And they have zealously undertaken its solution ; some with a hope of defending, and some of overthrowing, the scriptural account ; and some with great indifference in this respect. The truth seems at length to have been attained : and the conclusion to which the ablest and most candid zoologists have come, is, that “ there is no circumstance of difference between the varieties of the human race, which does not appear in a still greater degree among animals, chiefly of the domesticated kinds, arising from the ordinary sources of degeneration.”* Thus the reproach, which a hasty and half informed scepticism had cast upon the scriptural account of this subject, has been wiped away by patient research.

A universal deluge of the earth is an event of such magnitude and singularity that we should expect to find traces of it, even after the lapse of a myriad of years, not only in civil, but in natural history. Accordingly, in addition to that mass of evidence that flows in upon us, to prove the occurrence of such a catastrophe in former days, from the histories and traditions of almost every nation and tribe civilized and savage under heaven, we find the records of geology every where speaking the same language. It may be thought that I refer to the numerous organized remains, such as land animals, sea shells, corals and vegetables, that are found imbedded in solid rocks in the highest mountains in almost every part of the world, as proof of the Noachian deluge. It is not strange, indeed, that when such phenomena were first discovered, they should be referred to this cause. But modern geology teaches us that it is contrary to “ every rule of physical reasoning” to ascribe them to that convulsion. It is not possible that such immense mountains of fossils, most of them preserving their most delicate and frangible parts and retaining much order in their arrangement, should have

* Rees' Cyclopaedia, Art. Man.

been deposited during the one hundred and fifty days of the deluge. It was obviously a slow process, a work of much time, frequently suspended and renewed, and could not possibly have resulted from a catastrophe so violent and transitory as the Noachian deluge. Indeed, so conclusive appears the reasoning on this subject, (which can here only be touched upon) that it is painful to the Christian geologist, that such facts are still referred to as evidences of that convulsion : since an impression is thereby made upon the infidel geologist, that theologians are pressed for arguments to defend the sacred historian.*

* I am happy, on this point, to give the following extract from the recent very able work of Rev. W. D. Conybeare and W. Phillips, Esq. on the Geology of England and Wales. See page 57 of Introduction ; all of which is from the pen of Mr. Conybeare. He gives the following reasons for not referring the organick relics found in rock strata to the Noachian deluge.

“ 1st. Had these remains been brought to their present situation by diluvial currents, they ought to be mingled confusedly together ; we ought to have found the same genera and species in the lowest limestones and the highest beds above the chalk ; and those remains of land animals which appear undoubtedly to be diluvial, should have been mixed amongst them ; but the fact is notoriously otherwise, the organic remains being distributed in distinct assemblages, in such a manner that each formation is characterized by its peculiar assemblage, without confusion or intermixture. No transitory inundation can account for the circumstances of this distribution ; they are such as indicate beyond the possibility of reasonable doubt, that the animals imbedded in the strata lived and died in the spots where they are now found, while these continued for a long period under the waters of the ocean ; and that they were there buried under successive deposits formed beneath those waters during the progress of many ages. The perfect state of many of the most fragile shells also proves that they could not have been drifted from a distance by any violent convulsion.

“ 2dly. There is every reason, as we have seen, to ascribe the gravel debris derived from the partial destruction of the strata to the action of the deluge ; but the strata must evidently not only have been formed, but also consolidated, before solid fragments, such as could have assumed the present form of the gravel pebbles, could have been torn off from them. Now it does not seem within the limits of physical possibility to ascribe the formation of these strata and their

The proper evidence of the deluge is not to be derived, as already remarked, from the original and regular strata constituting the crust of the globe ; but from the accidents those strata have subsequently experienced, the abrasion and excavation of their surface, and the dispersion of the fragments thence broken off and rounded by attrition, obviously through the agency of water, and often mixed with the remains of land animals. These water worn pebbles almost every where cover the surface to a great depth, and afford conclusive proof of the Noachian deluge. Do you say they were rounded and carried to their present situations by rivers ? But they occur in vast quantities on the tops of the highest mountains, where no rivers ever could have flowed. They must therefore have resulted from some mighty catastrophe by which all the high hills under heaven were covered with water, which the scriptures declare to have happened in the days of Noah. Thus wherever the infidel goes, he finds the very stones crying out against him.

Modern geology has assumed an interesting attitude also consolidation (a process which must have evidently required time) to one and the same *transient* convulsion with their subsequent partial destruction ; this argument becomes stronger when we remember that there are interposed among the strata themselves many beds of similar gravel (for instance beds consisting of rounded fragments of carboniferous limestone associated with the more recent deposits of the second red sand stone) the unavoidable inference is, that the rock whence these pebbles were formed must in every instance have been consolidated before the rock containing them was deposited ; yet in the instance before us the deposition of the conglomerate rock must have preceded that of the highest strata, by the whole interval necessary to account for the formation of all the constituent beds of the colite, sand, and chalk series ; and all these again must have been consolidated before they were exposed to the action of the deluge. It matters not whether the time assigned to these effects be comparatively long or short ; it seems manifest that a single year must have been totally inadequate."

For other interesting matter concerning the geological evidence of the deluge, I beg leave to refer to Cuvier's *Theory of the Earth*, Greenough's *First Principles of Geology*, and Rev. Professor Buckland's *Inaugural Lecture*.

in respect to the antiquity of the earth as given by Moses. His chronology in this respect has been almost incessantly assailed from the days of Appion to the present. In the early stages of geological enquiry, every new fact was seized with avidity, as if well understood, and an attempt made to convert it into an engine to batter down the authority of Moses. Hence Cowper says sarcastically,

“ Some drill and bore

“ The solid earth, and from the strata there,

“ Extract a register, by which we learn

“ That he who made it and reveal'd its date

“ To Moses, was mistaken in its age.”

The present state of the geological objection to the scriptural account of the creation of the world is briefly as follows. The secondary rock strata of the globe, some of which constitute very high mountains, contain vast quantities of shells and land animals deposited in distinct and often successive assemblages, and many of them appear to have lived and died where they are now found, while the rock gradually accumulated around them. Now the objection is, that Moses does not allow time enough for all the phenomena of these depositions, in the six days of the creation.

The truth of this statement in regard to the remains of animals in secondary strata is unquestionable, and no geologist can suppose that immense mountains of rock could have been deposited, without a miracle, in six literal days. It would be a want of candour not to acknowledge that hundreds, not to say thousands of years, were requisite to effect this stupendous work. To reconcile the facts then with the Mosaic account is the problem the Christian geologist has to resolve.

It has already been remarked that to refer this extensive deposition of rocks with their imbedded relicks to Noah's deluge is contrary to correct physical reasoning. It is also too late by almost a century,* to denominate them a mere

* “ The great question now so much controverted in the world,” says Dr. Plot in his history of Oxfordshire, written in 1677, “ was, whether the stones we find in the form of shell fish, be *lapides* sa-

usus naturæ, or to maintain that these rocks were originally created with these remains imbedded, and that the animals they represent never had any real existence. It would be just as correct reasoning to say that the human skeleton one should find in the loose soil a few feet below the surface, never constituted a living man, but was created a skeleton originally; and a principle that leads to such results must surely banish all reason and consistency from our enquiries.

The question then returns how this problem is to be solved and the objection answered. I take the liberty of mentioning briefly three hypotheses,† any of which if adopted will resolve the difficulty, and each of which has found supporters among the most distinguished philosophers of the age, some of them learned and pious divines. The first has met with the fewest advocates.

1. Some suppose that the space between the creation and the deluge, being more than 1600 years, afforded sufficient time for the occurrence of all those changes and depositions we discover in the crust of the globe. Upon this hypothesis, the present continents must, in the beginning of the period, have been mostly submerged beneath the ocean, which gradually receded and left its depositions of rocks embracing various kinds of animals.

generis naturally produced by some extraordinary plastic virtue, latent in the earth, in quarries where they are found; or whether they rather owe their form and figure to the shells of the fishes they represent, &c.” The Doctor gives seven weighty reasons for believing in the former of these opinions. He had taken it for granted that Noah’s deluge was the *only* cause that could have produced the deposition of the remains in question; and perceiving this to have been too transitory for the purpose, he extricated himself from the dilemma by denying these fossils ever to have been possessed of life. In 1708 Scheuchzer published a work entitled, *Piscium Querelæ et Vindiciæ*, in which the unhappy fishes deplore very pathetically the hard fate they suffer in being degraded to the rank of mere dead matter. However, so late as 1752, M. Bertrand made what the Edinburgh Reviewers call a “last effort” to cut them off from their claims to be considered animals.

† See Conybeare and Phillips’s *Geology*, &c. p. 59. Introduction.

2. Another supposition adopted by several European divines is, that the periods of the creation, called days by Moses, are not literal days of twenty four hours, but periods of definite and considerable length, during which the secondary rocks were deposited. This figurative use of the term day to denote periods of various length, is not unfrequent in other parts of scripture and indeed in all languages.* *Ex. gr.* Job. xiv. 6, and xviii. 20. Ezek. xxi. 25. Luke xvii. 24. John viii. 56.

3. Others (and these are most numerous) suppose that Moses, after he has described in the first sentence of Genesis the fundamental fact of the original formation of all things by the will of God, may pass in silence a long intermediate state, whose ruins formed the chaotic mass he proceeds to describe, and out of which God in six days arranged the world we now inhabit. On this supposition the organic remains we now discover in the earth were deposited during this intermediate state.

In regard to these hypotheses, especially the last, it may be remarked, that the grand object of revelation is to give us the history of man from his first creation. And concerning the time in which he was formed there exists very little diversity of opinion—geologists of every name, infidel and Christian, generally agreeing, that the voice of nature united with the history of all nations in testifying to the truth of the Scriptures that man has existed on the globe not more than five or six thousand years. In proof of this, they appeal to the deltas of the Nile, the Po, the Rhine and the Arno; to the moving sand hills of France; to the peat morasses of the north of Europe, and to the steep declivities of mountains all over the world. The question then whether the earth existed for a time previous to the creation of man becomes a mere speculative enquiry of little practical importance. If any regard it necessary to explain existing phenomena to admit such a previous state, we do not so

* This hypothesis has been ably discussed within a few years past in Tillock's Philosophical Magazine.

how it affects the fidelity of the sacred historian at all. For it can never be shown that Moses fixes the exact time of the original creation of the globe, although he does that of the human race. The first verse of Genesis records an independent fact, which cannot be proved to belong to the same period as the events recorded in the subsequent verses.

To the man who is unacquainted with the facts modern geology developes, and who has not patiently and thoroughly examined the subject, but adopted as unquestionable truth the common exposition of the first chapter of Genesis, such views as these may seem the result of a hasty and dangerous criticism. It is true these sentiments have not excited much attention in this country : But it ought to be remembered that they are no longer novel in Europe, nor regarded as the mere wanderings of visionary geologists : and the fact that such divines as Chalmers, Conybeare and Sumner have in whole or in part adopted them, ought at least to obtain for them a candid examination.* The marked extrav-

* It is obvious that a brief statement of this interesting subject is all that could be attempted on such an occasion. The details and the reasons of the several opinions advanced, must be omitted almost entirely. I take the liberty however in this note, to present a short extract from the writings of each of the divines mentioned in the text.

“ Does Moses ever say that when God created the heavens and the earth he did more at the time alluded to than transform them out of previously existing materials ? Or does he ever say, that there was not an interval of many ages betwixt the first act of creation, described in the first verse of Genesis and said to have been performed at the *beginning* ; and those more detailed operations, the account of which commences at the second verse, and which are described to us under the allegory of days ? Or does he ever bring forward any literal interpretation of this history which brings him into the slightest contact with the doctrines of geology ? Or finally does he ever make us to understand, that the genealogies of man went any farther than to fix the antiquity of the species, and, of consequence, that they left the antiquity of the globe a free subject for the speculations of philosophers ?” Chalmers’ Evid. of Christianity in Ed. Encyclopedia, vol. 6. p. 228.

“ The great subject to which revelation relates, is the Providential history of man : the antiquity of the human race is therefore an es-

agance of former theories of the earth adopted by geologists, such as those of Burnet, Woodward, Buffon, Whiston and the whole school of Hutchinson, have produced a strong prejudice against every thing on the same subject. But the present constellation of European geologists are men of a very different stamp—men whose grand object is the collection of facts, and who are extremely cautious of hypothesis; adopting none, except such as seem absolutely necessary to

sential feature of that revelation; but the questions whether any other state of our planet preceded that in which it became the habitation of intellectual and moral agents, and if so, what convulsions may have happened to it during that state, are points with which it has no direct connection; a perfect knowledge of these could have furnished us no topics calculated either to awaken the slumbering, or to reassure the penitent conscience.” Conybeare in *Introd. to Geology of Eng. and Wales*, p. 59.

“All that I am concerned to establish is the unreasonableness of supposing that geological discoveries, so far as they have hitherto proceeded, are hostile to the Mosaic account of the creation. No rational naturalist would attempt to describe, either from the brief narration in Genesis or otherwise, the process by which our system was brought from confusion into a regular and habitable state. No rational theologian will direct his hostility against any theory, which, acknowledging the agency of the Creator, only attempts to point out the secondary instruments he has employed.—According to that history, (the Mosaic) we are bound to admit, that only one general revolution of the globe has taken place since the period of that creation which Moses records, and of which Adam and Eve were the first inhabitants. The certainty of one event of that kind would appear from the discoveries of geologists, even if it were not declared by the sacred historian. But we are not called upon to deny the possible existence of previous worlds, from the wreck of which our globe was organized, and the ruins of which are now furnishing matter to our curiosity.” *Summers’ Records of Creation*, vol. 2. p. 356.

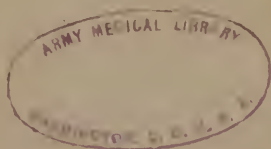
Among those gentlemen in this country, who have publicly maintained sentiments similar to those given above, I trust I shall be pardoned in naming Professor Silliman; who, in his able and eloquent lectures on geology, has been for several years in the habit of illustrating and defending such views of this subject, with all that clearness and force which experience and accurate knowledge enable him to do: and it gives me pleasure to add, with all that zeal too, with which an ardent attachment to revealed religion inspires him:

explain appearances.* And in regard to the hypothesis that have been given above relative to the antiquity of the earth, "it does not become us," says one of these geologists, "to propose them with any feeling of confidence. It is amply sufficient for our purpose to shew that there exists more than one mode, by which the appearances presented by the structure of the globe may be satisfactorily reconciled to the facts recorded by Moses, in order to remove the objection which has been drawn from them." Let it be admitted that this is shown, and every candid man must regard geology as affording a triumphant support to the sacred historian.

Such are the prominent utilities of the study of natural history. And in view of the subject, I cannot but remark upon the importance of united and systematic efforts for its promotion. Its successful cultivation by solitary and insulated individuals ought never to be expected. These pursuits, above all others, need concentrated exertion. Cabinets of natural history must be formed, which the student may consult, or his knowledge will be extremely vague and inaccurate. In order to form cabinets, such as are attached to these studies must associate. The advantage gained by such associations is not in the simple ratio of the numbers united: but it is nearer to a geometrical ratio: that is, the combined efforts of two produce more than double the effect of an individual; and so on. This principle has long been well understood and acted upon by the scientific world, as the numerous societies in Europe and this country abund-

* In proof of this I appeal to the following characteristic extract, which the London Geological Society, embracing many of the first geologists in Europe, have chosen for their motto.

Quod si cui mortalium cordi et curae sit, non tantum inventis hæc-
rere, atque his uti, sed ad ulteriora penetrare; atque non disputando
adversarium, sed opere naturam vincere; denique non belle et pro-
babiliter opinari, sed certo et ostensive scire; tales, tanquam veri sci-
entiarum filii, nobis (si videbitur) se adjungant. See title page to
the geolog. Trans,



antly testify.† These have drawn the scattered rays of knowledge into a focus, whose intensity and brilliancy now spread a glory over Christendom, and paint a bow of promise on the cloud of ignorance that hangs over the lands of paganism. A detail of the labors of these institutions cannot be expected on this occasion. Let it stand *instar omnium*, to mention that the transactions of the London Royal Society contain more than 4000 memoirs, and those of the French Academy of Sciences occupy 140 quarto volumes.

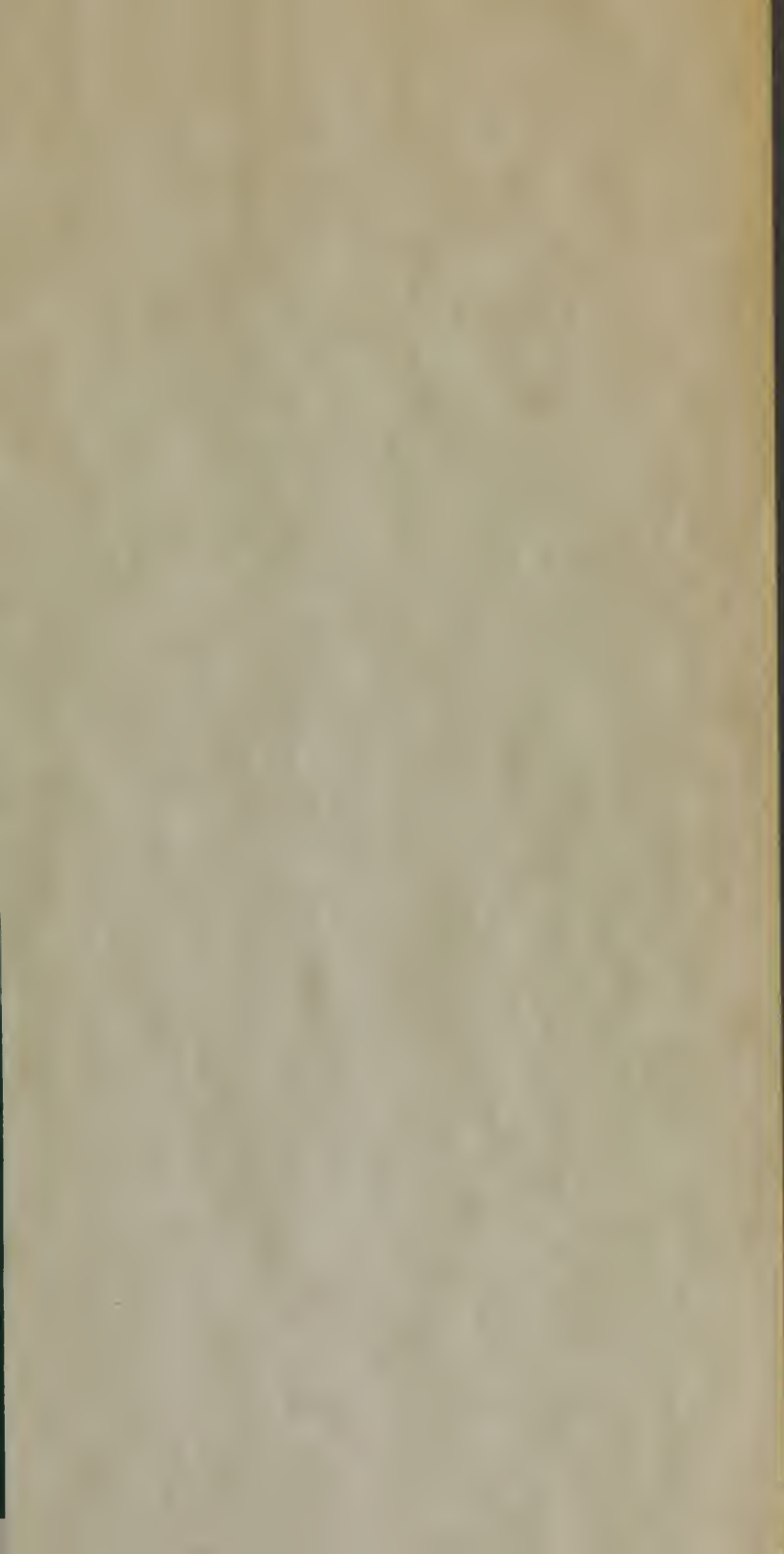
The location of a society in this place for the promotion of natural history must be regarded as judicious; especially as it is connected with a Medical Institution, to which, at the present day, it seems a peculiarly appropriate and almost indispensable adjunct. The natural history of New England, in every branch, is but just beginning to be explored; and this lyceum will form a convenient centre from which zealous naturalists may proceed to examine the interesting regions around, and to which they may return laden with the spoils of nature. It needs but the zealous efforts of a few amateurs, and the patronage of all the intelligent, and such an association must live and flourish. Many it is hoped will here be raised up, who will be able to speak of *trees from the cedar to the hyssop, and of beasts, and of fowl, and of creeping things, and of fishes.*

To conclude; I remark in view of the subject that has been under consideration, that if the study of that small part of creation this earth presents, yields so much instruction and pleasure, how enrapturing will be the views of the works of God that will burst on the soul of the glorified spirit in

† The principal Societies in the United States, embracing the natural sciences in their plan, are the following: Amer. Philos. Soc. Philadelphia: Am. Acad. Arts and Sciences, Boston: Connect. Acad. Arts and Sciences: Linnean Soc. Philad. Linnean Soc. Boston: Amer. Geolog. Soc. Columb. Chemical Soc. Philad. Lit. and Phil. Soc. N. York: Lit. and Phil. Soc. Charleston: Acad. Nat. Sci. Philad. Cabinet of Sci. Philad. Columbian Institut. Washington: School of Arts, Cincinnati: Lyceum Nat. Hist. N. York: do. Hudson: do. Troy: Hist. Soc. N. York; and the Agricult. Soc. Philad.

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